

[54] **ROTATABLE SPOUT CLOSURES WITH LATCH STRUCTURES**

[72] Inventor: Robert E. Hazard, North Kingston, R.I.

[73] Assignee: Polytop Corporation, Slatersville, R.I.

[22] Filed: July 27, 1970

[21] Appl. No.: 58,263

[52] U.S. Cl. 222/153, 222/498, 222/534, 222/536, 222/538

[51] Int. Cl. B67d 5/32

[58] Field of Search 222/153, 533, 534, 535, 536, 222/538, 498; 220/27

[56] **References Cited**

UNITED STATES PATENTS

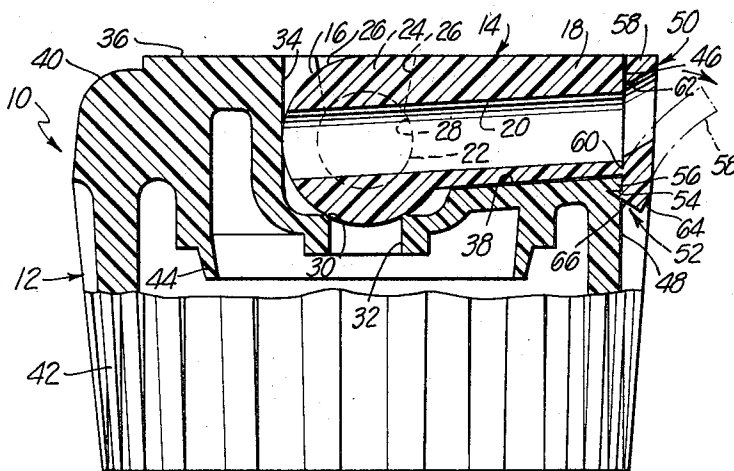
3,477,618	11/1969	Hazard222/534
3,255,928	6/1966	Foster222/153

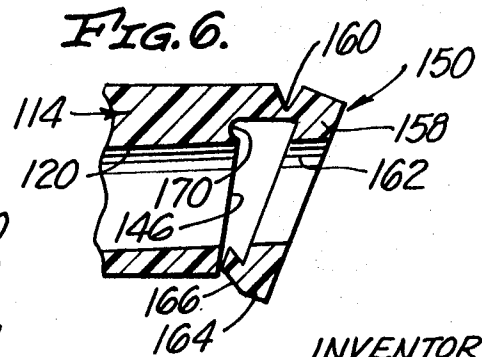
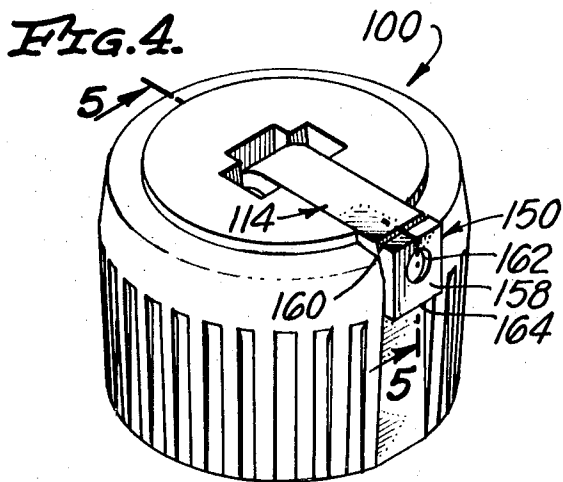
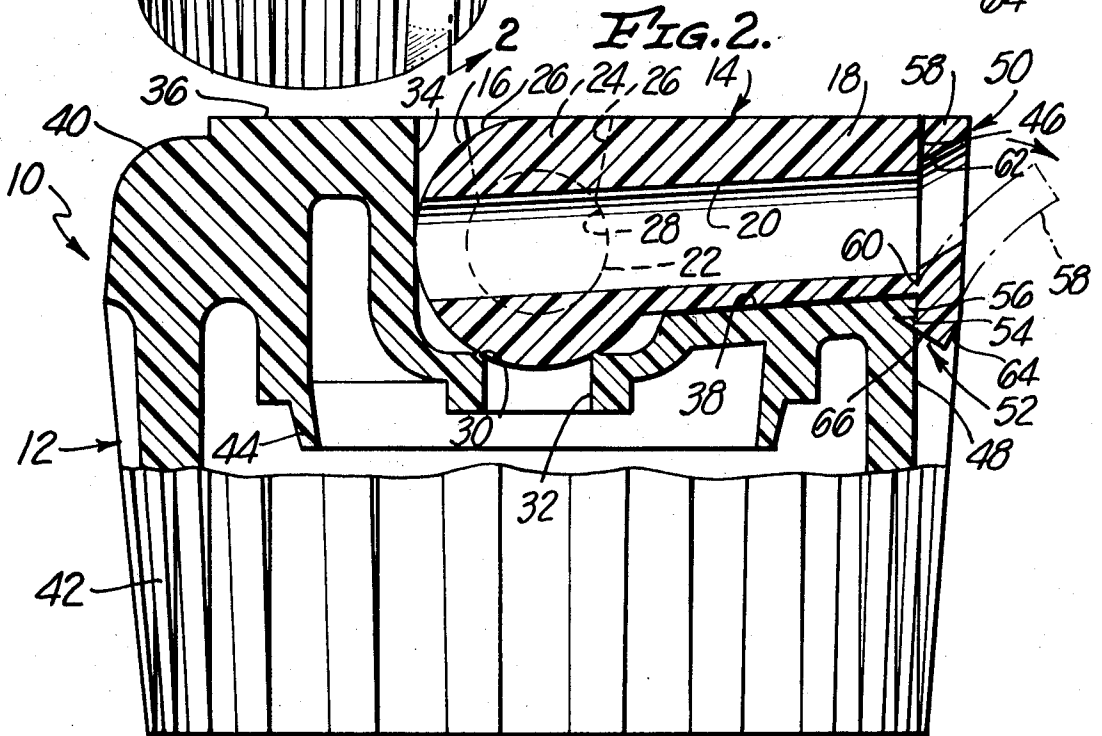
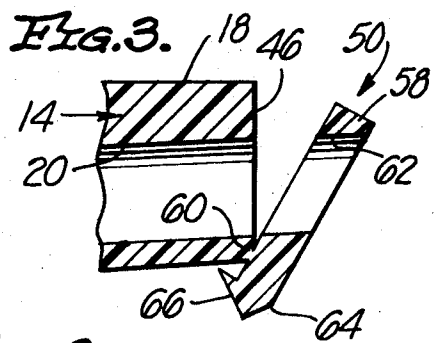
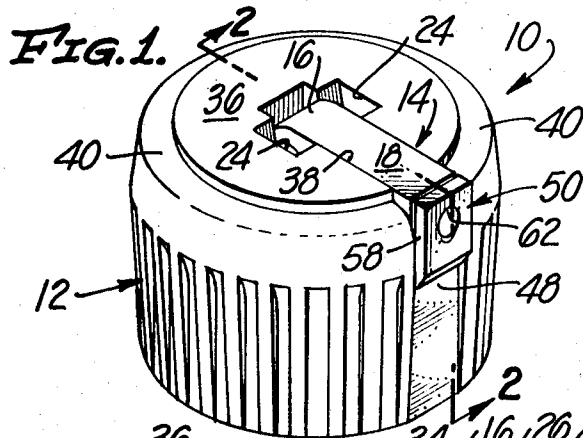
Primary Examiner—Robert B. Reeves
Assistant Examiner—Francis J. Bartuska
Attorney—Edward D. O'Brian

[57] **ABSTRACT**

Dispensing closures each having a closure body and a spout rotatably mounted on the closure body so as to be capable of being rotated between open and closed positions can be constructed so as to be incapable of accidental or unintentional opening under normal circumstances by the use of the latch means and a catch means. Either of these means can be located on the body and the other on the spout. These means are constructed so that they will engage one another, preventing undesired spout rotation, upon the spout being assembled in a closed position. By manipulation of the latch means the spout in a closure as described can be rotated from a closed position to an open position once the closure has been assembled with the spout in a closed position.

12 Claims, 8 Drawing Figures





INVENTOR
ROBERT E. HAZARD
BY
EDWARD D. O'BRIAN
ATTORNEY

FIG. 5.

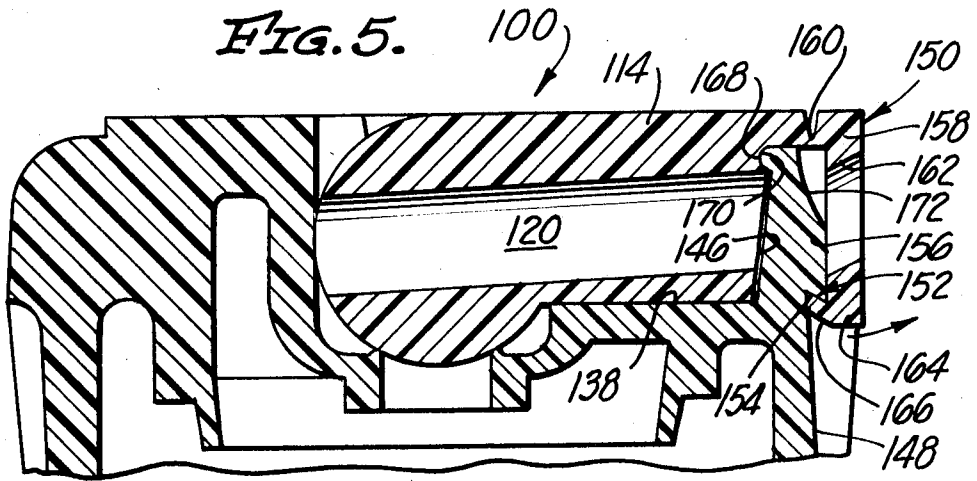


FIG. 7.

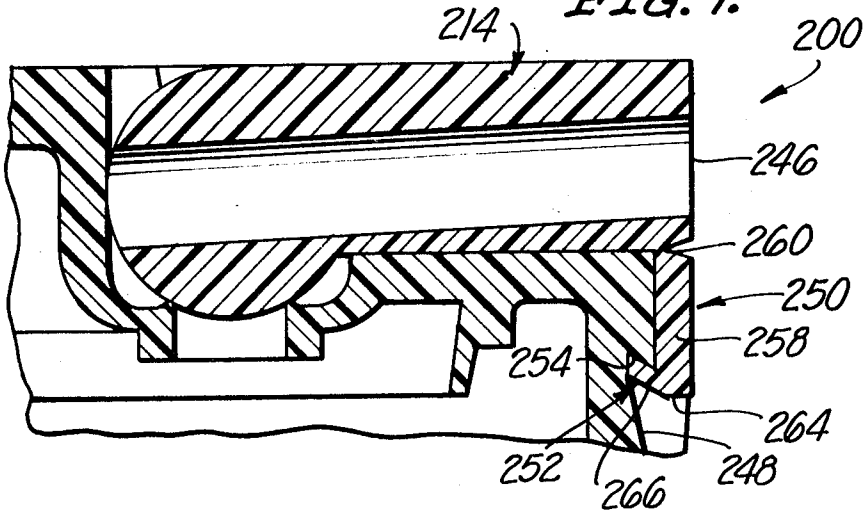
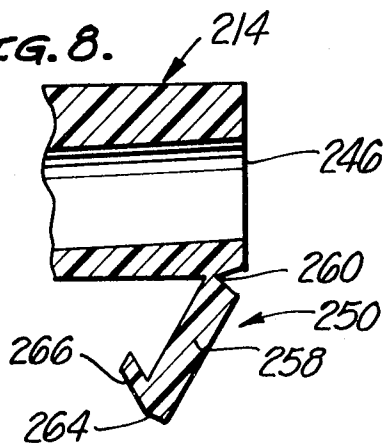


FIG. 8.



INVENTOR
ROBERT E. HAZARD
BY
EDWARD D. O'BRIAN
ATTORNEY

ROTATABLE SPOUT CLOSURES WITH LATCH STRUCTURES

BACKGROUND OF THE INVENTION

Increasing concern over safety has made commercially desirable the development of dispensing closures which cannot accidentally or unintentionally be opened under normal circumstances. In the past, many of these closures have been constructed so as to utilize a closure body or cap and a spout rotatably mounted on such a closure body so as to be capable of being rotated between opened and closed positions. When such a spout is in an open position, a passage within the spout is aligned with an opening in the closure body, and when the spout is in the closed position the opening in the closure body is sealed off by contact with the spout. A dispensing closure of this type is shown in the Wilson et al. U.S. Pat. 2,793,795. Other closures of this type are known.

With the present concern over safety, it is considered that to be acceptable commercially such closures should be extremely difficult to open and close. However, they should not be so difficult to open and close that they cannot be opened and closed by individuals such as arthritics who do not have what may be regarded as complete muscular control. However, they should be sufficiently difficult to open so that they cannot be readily opened by comparatively young children.

SUMMARY OF THE INVENTION

An objective of the present invention is to supply new and improved rotatable spout dispensing closures which are constructed so that they cannot be readily opened accidental or unintentionally. By way of explanation it is intended that the closures of this invention be of such a nature that children of comparatively minor years will not be able to open them under normal circumstances, but that these closures be of such a character that they can be readily opened by somewhat infirmed individuals capable of normal mental processes. Further objectives of the present invention are to provide dispensing closures of the type described which can be manufactured at substantially the same cost as present-day related dispensing closures, which may be easily and conveniently assembled, which may be operated normally, and which are extremely effective for their intended purpose.

In accordance with this invention, these objectives are achieved by providing in a dispensing closure having a closure body and a closure spout rotatably mounted on the body so as to be capable of being rotated between an open position in which a passage in the spout is aligned with an opening in the closure body and a closed position in which the opening is sealed off by contact with the spout, the improvement which comprises: a latch means and a catch means, both of these means cooperating with one another for the purpose of holding or latching the spout in the closed position.

In a structure of this invention, one of the means are located on the spout and the other on the closure body. These means are constructed so as to interengage one another when the spout is assembled when the spout is assembled or moved to a closed position so as to latch or hold the spout in such a closed position. They are constructed so that the latch means is capable of being manipulated so as to permit the spout to be rotated to an open position.

BRIEF DESCRIPTION OF THE DRAWINGS

Further details of this invention as well as the manners in which the invention achieves the various objectives indicated in the preceding it will be apparent from a careful consideration of the remainder of this specification, the appended claims, and the accompanying drawings in which:

FIG. 1 is an isometric view of a presently preferred embodiment or form of a dispensing closure of this invention;

FIG. 2 is a partial cross-sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view of a spout as shown in the closure illustrated in the preceding figures showing the orientation of parts of the spout as manufactured;

FIG. 4 is an isometric view of a modified form of a dispensing closure of this invention;

FIG. 5 is a partial cross-sectional view taken at line 5—5 of FIG. 4;

FIG. 6 is a cross-sectional view of a spout as shown in the closure illustrated in FIGS. 4 and 5 showing the orientation of parts of the spout as manufactured;

FIG. 7 is a partial cross-sectional view corresponding to FIGS. 2 and 5 of a still further modified dispensing closure of this invention; and

FIG. 8 is a cross-sectional view of a spout as shown in the closure illustrated in FIG. 7 showing the orientation of parts of this spout as manufactured.

From a careful consideration of the drawings, it will be realized that these drawings show several different embodiments or forms of dispensing closures embodying or constructed in accordance with the concepts of this invention. From this it will be realized that these concepts are broader than the specific structures shown. They may be embodied within other somewhat differently appearing and/or somewhat differently constructed dispensing closures through the use or exercise of routine engineering skill.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings there is shown a dispensing closure 10 of the present invention. This closure is largely constructed as described in the Wilson et al. U.S. Pat. No. 2,793,795 so as to include a cap or closure body 12 and a spout 14. These parts are separately integrally formed out of a polyolefin material such as linear or non-linear polyethylene, isotactic polypropylene or the like. They may also be formed of other polymers having similar physical properties.

As formed the spout 14 includes a cylindrical base 16 from which there extends a spout part or nozzle 18. This base 16 and the spout part 18 include a centrally located passage 20 which extends through them. The base 16 carries axially aligned trunnions or shafts 22 which are adapted to be located within entrances 24 having tapered walls 26 so that they may be "popped" by temporary material deformation into bearing openings 28. It is noted that the walls 26 are shaped so as to intersect the openings 28 in order to define what may be regarded as restricted entrances of smaller widths than the diameter of the trunnions 22 into these openings 28.

When the trunnions 22 are assembled within the openings 28, the base 16 is held by contact between the trunnions 22 and the openings 28 so as to bear against a sealing ring 30 located around an opening 32 in a centrally located cavity 34 in the top 36 of the closure body 12. It will be noted that in the assembled position substantially all of the base 16 fits within the cavity 34. The sealing ring 30 is an integrally formed resilient sealing ring capable of forming a seal against the base 16 at all times. This sealing ring may be constructed in several different manners. One preferred way of constructing this sealing ring 30 is shown in the Akers U.S. Pat. No. 3,495,745.

Once the trunnions 22 have been assembled within the openings 28 the spout 14 may be manipulated so as to be rotated between an open position in which it extends vertically from the top 36 of the body 12 with the passage 20 in alignment with the openings 32 to a closed position in which it extends substantially horizontally in a slot 38 in the top 36 formed to receive it. In FIGS. 1 and 2 this spout 14 is shown in this closed position. This slot 38 extends from the cavity 34 so as to intersect a rounded edge 40 of the top 36 separating the top 36 from a peripheral skirt 42. This skirt 42 is preferably constructed in a conventional manner so as to include internal means such as threads (not shown) for attaching the closure 10 to an appropriate container.

To aid in forming a seal with such a container, a sealing ring 44 for engaging a container neck may be located on the under surface of the top 36 within the skirt 42. A particularly suitable, preferred sealing ring 44 is constructed as shown in the LaVange U.S. Pat. No. 3,370,732. Such a sealing ring 44 is il-

lustrated. Other ring structures serving may be employed as the ring 44.

In the closure 10 the novelty is not found in the structure previously described but is found at the end 46 of the spout 14 and along what may be regarded as a front surface of the skirt 42. In this closure 10, the novelty pertains to the use of a latch means 50 formed integrally with the spout 14 and to a catch means 52 formed at the front surface 48. This catch means 52 includes a small groove 54 located in the surface 48 directly beneath the end 46 of the spout 14 when the spout is in a closed position. This groove 54 is separated from the slot 38 by a small wall 56.

The latch means 50 includes a tab 58 attached to the bottom of the end 46 of the spout 14 by means of a small hinge section 60. This tab 58 is integrally formed with the section 60 and the spout 14. Preferably, this tab 58 is of such dimension as to substantially cover the end 46 of the spout 14 and of such dimension as to extend beneath the spout 14 to approximately opposite the groove 54 when the spout 14 is in a closed position. If convenient for molding purposes the tab 58 may include an extension 62 of the passage 20. As formed the tab 58 is preferably oriented with respect to the spout 14 as indicated in FIG. 3 so that a hook-like end 64 on it extends generally towards the base 16.

This structure is designed so that a sloping wall 66 on the end 64 will engage the wall 56 so as to be deflected in order to bend the tab 58 up against the end 46 as the spout 14 is assembled on the closure body 12 in a closed position. Engagement of the surface 66 with the wall 56 will cause temporary material deformation during such assembly until such time as the end 64 "pops" past the wall 56 into the groove 54. This end 64 is shaped so as to be complimentary to the shape of the groove 54 so that the end 64 will hold against the groove 54, preventing undesired rotation of the spout 14.

When it is desired to rotate the spout 14 to an open position, the tab 58 may be rotated or pushed away from the end 46 as shown by the arrow in FIG. 2 to a position as shown in phantom in this figure. As this occurs the section 60 will normally be franged because of its small cross-sectional configuration, breaking off the tab 58. Thereafter, the spout 14 may be rotated between open and closed positions in a conventional manner. It will be realized that the tab 58 is connected by the section 60 to the end 46 so that leverage will facilitate the tab 58 being broken off in this manner.

It will be realized that by a simple reversal of parts the latch means 50 can be located directly upon the surface 48 and that the catch means 52 can be located upon the ends 46 of the spout 14. Such a structure is not preferred because of the simplicity of the structure described and because of the leverage obtainable with the described structure. With the described structure the section 60 is molded so that it in effect also acts as a spring means to maintain engagement between the end 64 and the groove 54.

In the closure 10, the latch means 50 is essentially a break-off type of latch designed to prevent inadvertent, accidental or undesired rotation of the spout 14 until the latch means 50 is disengaged from the catch means 52. If for any reason such as undue thickness of the section 60 the tab 58 does not break off as intended the closure 10 may still be used by a user engaging the hooked end 64 so as to spring this hooked end 64 out of engagement with the groove 54 and then thereafter rotating the spout 14.

In FIGS. 4, 5 and 6 of the drawings there is shown a modified dispensing closure 100 which is exceedingly similar to the closure 10. For convenience and in the interest of brevity, various parts of this closure 100 which are the same or substantially the same as various parts of the closure 10 are not separately described herein and where it is necessary to refer to such parts herein, and where such parts are shown in the drawings, they are designated by the same numerals previously used to designate them preceded by the numeral 1. Various parts of the closures 10 and 100 which are the same are not illustrated in the drawings.

The closure 100, a different latch means, 150 than the latch means 50 previously described is utilized with another catch means 152 which also has a groove 154 corresponding to the groove 54 previously discussed. In the closure 100 a wall 156 immediately above the groove 154 extends vertically so as to close off the end of the slot 138. In the closure 100 the latch means 152 also includes a tab 158 which is secured to the top of the end 146 of the spout 114 by means of a small hinge-like, spring-like section 160. The spring-like section of the section 160 may be obtained by molding it and the tab 158 as shown in FIG. 6. This tab 158 may also include an extension 162 of the passage 20 if this is convenient for molding purposes.

The tab 158 also includes a hooked end 164 having a bottom sloping surface 166 which is adapted to engage the wall 156 as the spout 114 is rotated to a closed position so as to bend the tab 158 in such a manner that the end 164 may be "snapped" into the groove 154 as shown in FIG. 5 of the drawing. Once in this position the tab 158 may be engaged along the surface 166 at the front surface 148 so as to be rotated in the direction of the arrow shown in FIG. 5 so as to move the end 164 out of engagement with the groove 154. Thereafter, by pushing upwardly upon the tab 158 and continuing such rotation, the tab 158 may be broken off of the end 146 of the spout 114 so that the closure 100 can be operated in a conventional manner.

If desired, the section 160 can be molded so as to be thick enough so that it cannot be readily franged. In this case the closure 100 may be opened by moving the tab 158 so that the end 164 clears the wall 156 and so that the spout 114 may thereafter be pushed or rotated to an open position. It is preferred however, to form the closure 100 so that the section 160 may be easily franged since normally only an initial impediment to closure opening is desired.

If desired, the closure 100 may include a small bead 168 on the wall 156 opposite the ends 146 of the spout 114 to aid in securing the spout 114 against undesired rotation. This structure is intended so that the bead 168 may be "popped" into a groove 170 in the end 146 when the spout 114 is rotated to a closed position as the result of temporary material deformation. When the spout 114 is opened such deformation also occurs so that the bead 168 can be "popped" or "snapped" out of the groove 170. If desired, a small cavity 172 may be located at the front surface 148 in the wall 156 so as to facilitate engagement of an extending portion 174 of the spout 114 which carries the section 160. This portion 174 is, of course, only used after the tab 158 is broken off, and is used for rotating the spout 114.

In FIGS. 7 and 8 of the drawings there is shown a further modified dispensing closure 200 of the present invention which again is very similar to the closure 10 previously described. In the interest of brevity the parts of the closure 200 which are of the same or substantially the same as various parts of the closure 10 are not separately described in this specification, and where illustrated in the drawings and referred to herein are designated by the numbers previously used to designate such parts preceded by the number 2. Various parts of the closure 10 and 200 which are the same are not indicated in the drawings, or in this specification.

In the closure 200 a latch means 250 is located generally beneath an end 246 of the spout 214 so as to cooperate with a groove 254 located in a front surface 248. In the closure 200 there is no wall exactly corresponding to the wall 56 since the groove 254 is located in this surface 248. With the closure 200 the latch means 250 includes another tab 258 which is exceedingly similar to the tab 58. It is connected to the bottom of the end 246 of a spout 214 by a small section 260 which serves to hold it so that a hooked end 264 will engage the groove 254 when the spout 214 is rotated to a closed position. During such rotation a surface 266 engages the front surface 248 so as to temporarily deform the tab 258 so that the end 264 will snap into the groove 254. Preferably this tab 258 is molded with the spout 214 so as to extend with respect to the spout 14 as shown in FIG. 8 in order that the section 260 will

exercise a slight spring action, biasing the end 264 into engagement with the groove 254. This is the same type of spring action as is achieved by molding the tab 258 and the section 260 as shown in FIG. 6 of the drawings.

The closure 200 is cavity in substantially the same manner as the closure 10 and 100. When the spout 14 is to be opened the tab 258 is engaged and pulled so as to release the end 264 from the groove 254. Normally the section 260 will be thin enough so that during such operation the tab 258 may be easily broken off this spout 214 as this is done. When this is the case the spout 214 may thereafter be rotated in a conventional manner between open and closed positions.

However, if desired, the section 260 may be made sufficiently thick so that it will not be broken off as the tab 258 is moved so as to disengage the hooked end 264 from the groove 254. When the tab 258 is not broken off, pressure can be directly applied to it and/or the spout 214 to rotate the spout 214 to an open position as soon as the hooked end 264 is free. Where the tab 258 remains on the spout 214 this tab 258 will normally automatically operate so that the end 264 engages the groove 254 each time the spout 214 is moved to a closed position.

From a careful consideration of the closures 100 and 200 it will be realized that they can be constructed with a simple reversal of parts so that the latch means 150 and 250 are located on the closure bodies 112 and 212 and so that the catch means 152 and 252 are located upon the ends 146 and 246 of the spouts 114 and 214. Such structures are not normally desired since the structures illustrated work effectively and since the normal user of a dispensing closure having a rotatable spout will associate movement of some part of the spout as being necessary to rotation of the spout itself. In this field of dispensing closures customer recognition of the mode of use is considered important from a commercial standpoint.

It will be realized from a consideration of the preceding that the closures 10, 100 and 200 are simple, effective devices which may be easily molded and assembled at a cost which is not significantly different from the costs of molding and assembling prior related closures. It will be realized that in spite of the simplicity of these closures that they are effective for their intended purpose and that they may be easily and conveniently used by a customer.

I claim:

1. In a dispensing closure having a closure body and a spout, said closure body having an opening extending therethrough, said spout having a passage extending therethrough and being rotatably mounted on said closure body so as to be capable of being rotated between an open position in which said passage is aligned with said opening and a closed position in which said spout seals off said opening, the improvement which comprises:

a latch means and a catch means for latching said spout in said closed position,
 one of said means being located on said spout and the other of said means being located on said closure body,
 said means both being integrally formed with the parts of said dispensing closure upon which they are located,
 said latch means including a tab which is movable with respect to the part of said dispensing closure upon which said latch means is located and a hooked end located on an extremity of said tab,
 said catch means comprising a groove,
 said latch means being sufficiently deformable and movable so that contact of said hooked end with the part of said dispensing closure upon which said catch means is located will cause temporary deformation of said latch means so that said hooked end will snap into and engage said groove in such a manner as to prevent rotation of said spout relative to said closure body
 said latch means being located at the end of said spout so that said tab overlies the end of said spout,
 said tab being integrally connected to said spout by a hinge section forming a part of said latch means, said hinge sec-

tion extending across the bottom of the end of said spout, and

said hooked end being located in said tab beneath the bottom of said spout and is resiliently biased into engagement with said groove by said hinge section serving as a spring.

2. A dispensing closure as claimed in claim 1 wherein:

said hinge section has a sufficiently small cross-sectional configuration so that it will break upon the movement of said latch means relative to said spout so as to release said hooked end from said groove, enabling said dispensing closure to be thereafter operated without impediment from said latch means and said catch means.

3. In a dispensing closure having a closure body and a spout, said closure body having an opening extending therethrough and being rotatably mounted on said closure body so as to be capable of being rotated between an open position in which said passage is aligned with said opening and a closed position in which said spout seals off said opening, the improvement which comprises:

a latch means and a catch means for latching said spout in said closed position,

one of said means being located on said spout and the other of said means being located on said closure body,

said means both being integrally formed with the parts of said dispensing closure upon which they are located,

said latch means including a tab which is movable with respect to the part of said dispensing closure upon which said latch means is located and a hooked end located on an extremity of said tab,

said catch means comprising a groove,

said latch means being sufficiently deformable and movable so that contact of said hooked end with the part of said dispensing closure upon which said catch means is

located will cause temporary deformation of said latch means so that said hooked end will snap into and engage said groove in such a manner as to prevent rotation of said spout relative to said closure body,

said latch means being located at the end of said spout so that said tab overlies the end of said spout,

said tab being integrally connected to said spout by a hinge section forming a part of said latch means, said hinge section extending across the top of the end of said spout,

said hooked end being located on said tab beneath the bottom of said spout and is resiliently biased into engagement with said groove by said hinge section serving as a spring.

4. A dispensing closure as claimed in claim 3 wherein:

said hinge section has a sufficiently small cross-sectional configuration so that it will break upon the movement of said latch means relative to said spout so as to release said hooked end from said groove, enabling said dispensing closure to be thereafter operated without impediment from said latch means and said catch means.

5. In a dispensing closure having a closure body and a spout, said closure body having an opening extending therethrough, said spout having a passage extending therethrough and being rotatably mounted on said closure body so as to be capable of being rotated between an open position in which said passage is aligned with said opening and a closed position in which said spout seals off said opening, the improvement which comprises:

a latch means and a catch means for latching said spout in said closed position,

one of said means being located on said spout and the other of said means being located on said closure body,

said means both being integrally formed with the parts of said dispensing closure upon which they are located,

said latch means including a tab which is movable with respect to the part of said dispensing closure upon which said latch means is located and a hooked end located on an extremity of said tab,

said catch means comprising a groove,

said latch means being sufficiently deformable and movable so that contact of said hooked end with the part of said dispensing closure upon which said catch means is located will cause temporary deformation of said latch means so that said hooked end will snap into and engage said groove in such a manner as to prevent rotation of said spout relative to said closure body,

said latch means being located at the end of said spout so as to extend beneath said spout,

said tab being integrally connected to said spout at the bottom of said spout by a hinge section forming a part of said latch means,

said hinge section serving as a spring to resiliently bias said hooked end into engagement with said groove.

6. A dispensing closure as claimed in claim 5, wherein:

said hinge section has a sufficiently small cross-sectional configuration so that it will break upon the movement of said latch means relative to said spout so as to release said hooked end from said groove, enabling said dispensing closure to be thereafter operated without impediment from said latch means and said catch means.

7. In a dispensing closure having a closure body and a spout, said closure body having an opening extending therethrough, said spout having a passage extending therethrough and being rotatably mounted on said closure body so as to be capable of being rotated between an open position in which said passage is aligned with said opening and a closed position in which said spout seals off said opening, the improvement which comprises:

a latch means and a catch means for latching said spout in said closed position,

one of said means being located on said spout and the other of said means being located on said closure body,

said means both being integrally formed with the parts of said dispensing closure upon which they are located,

said latch means including a tab and a hinge section connecting said tab with respect to the part of said dispensing closure upon which said latch means is located, said hinge section enabling said tab to be moved with respect to the part of said dispensing closure upon which said latch means is located, said tab having a hooked end located on an extremity of said tab,

said latch means and said hinge section being integral with one another and with the part of said dispensing closure upon which said latch means is located,

said catch means comprising a groove, the material within said hinge section being sufficiently resilient so as to serve as a spring resiliently holding said tab so that said hooked end is resiliently held in said groove,

said latch means being sufficiently deformable and movable so that contact of said hooked end with the part of said dispensing closure upon which said catch means is located will cause temporary deformation of said latch means so that said hooked end will snap into and engage said groove in such a manner as to prevent rotation of said spout relative to said closure body,

said tab having an extremity located so as to be manually accessible from the exterior of said closure, said extremity being capable of being engaged so as to move said tab so that said hooked end is free from said groove so that said spout can be rotated to said open position.

8. A dispensing closure as claimed in claim 7 wherein:

said hinge section has a sufficiently small cross-sectional configuration so that it will break upon the movement of said latch means relative to the part of said dispensing closure upon which said latch means is located so as to release said latch means from said catch means, enabling said dispensing closure to thereafter be operated without impediment from said latch means and said catch means.

9. A dispensing closure as claimed in claim 7, wherein:

said hinge section has a sufficiently thick cross-sectional configuration so that it will not break upon repeated movement of said latch means so as to release said latch means from said catch means.

10. A safety closure structure, said closure structure having a closure body adapted to be secured to a container, said closure structure also having a closure member rotatably mounted on said closure body, said closure member being capable of being moved between open and closed positions, said closure body having an opening extending therethrough, said opening being closed when said closure member is in said closed position and being open when said closure member is in said open position, in which the improvement comprises:

a latch means for engagement between said closure body and said closure member in order to prevent said closure member from being moved from said closed position to said open position,

said latch means extending between said body and said member in order to prevent movement of said member when said member is in said closed position,

a portion of said latch means extending to the exterior of said closure structure, said portion being capable of being manually engaged so as to move said latch means to a position in which said closure member can be moved from said closed to said open position, and

means for automatically moving said latch member to a position in which it extends between said closure body and said closure member so as to prevent movement of said closure member whenever said closure member is moved from said open to said closed position.

11. A safety closure structure as claimed in claim 10, wherein:

said means for automatically moving said latch means is a resilient hinge mounting said latch member on said closure structure.

12. A safety closure structure as claimed in claim 11, wherein:

said latch means, said means for automatically moving said latch means and said closure member are integrally formed of a material which is sufficiently resilient to permit said means for automatically moving said latch means to operate as a spring.

* * * * *

60

65

70

75

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,655,099 Dated April 11, 1972

Inventor(s) ROBERT E. HAZARD

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 5, "cavity" should be --used--;

Column 6, line 15, after the word "therethrough" insert the following phrase, --said spout having a passage extending therethrough--;

Signed and sealed this 25th day of July 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents